URS

Loxwood

Traffic Calming Report

November 2013

47068226

Prepared for:
Loxwood Parish Council

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REVISION SCHEDULE					
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EXECUTIVE SUMMARY

URS has been commissioned by Loxwood Parish Council (LPC) to investigate the feasibility of providing various traffic calming measures throughout the village as a means to reduce vehicle speeds and improve the crossing facilities for pedestrians.

Vehicle speeds through the village were recorded to be in excess of the 30mph speed limit; the 85th percentile speeds being 40.5mph, so there is a need to provide a series of traffic calming features that will reduce vehicle speeds and improve the environment for non-motorised users of the highway.

It is recommended that a series of traffic calming features are implemented at various locations including North Hall, the Nursery, the shops (butchers and Post Office), the two Gateways into the village and on Station Road. These features should be complementary and as a whole reduce vehicle speeds through the village. Once the traffic speed reduces significantly, then mini roundabouts could be provided to form entrances to the proposed housing developments.

This report discusses various traffic calming measures that would be suitable for inclusion in a Traffic Calming Scheme and the order in which they should be considered. A major change to the village around the shops would be to create a “shared space” where motorists and pedestrians would share the available space with the carriageway raised up to the footway levels, thus giving no one road user the priority, so vehicles would have to slow down.

All proposals would need to be discussed with the Highway Department of West Sussex County Council in terms of their suitability and then developed into an Outline Design.

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No allowance has been made for changes in prices or exchange rates or changes in any other conditions which may result in price fluctuations in the future. Where assessments of works or costs necessary to achieve compliance have been made, these are based upon measures which, in URS' experience, could normally be negotiated with the relevant authorities under present legislation and enforcement practice, assuming a pro-active and reasonable approach by site management.

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TABLE OF CONTENTS

1 INTRODUCTION

URS has been commissioned by Loxwood Parish Council (LPC) to investigate the feasibility of providing various traffic calming measures throughout the village. This will include:

- Traffic Calming and Speeding Measures;
- Pedestrian Crossings Points;
- Footway Widening;
- On-carriageway Parking;
- Cycle facilities;
- Access to potential Development Sites; and
- HGV (except access) ban.

A URS site visit was carried out on Wednesday 9 October 2013 with four representatives of LPC to assess and evaluate these aspects as well as to obtain a clearer understanding of Loxwood Parish Council's concerns and ideas for the area. The report will address all of the above issues. A copy of the Brief is provided in Appendix A.

Loxwood village is located on the B2133 (High Street) and there is currently a 30mph speed limit through the village. The speed limit increases to 40mph as motorists leave the village in a northbound direction whereas the speed limit is derestricted (60mph) as motorists travel south out of the village.

At the northern end of the village, the centre line road markings and cats eyes have been removed, but this does not continue throughout the village.

A previous URS report (Transport Evidence Base Support for the Loxwood Neighbourhood Plan) identified high traffic speeds (85th percentile speed of 40.5mph) through the village and several footway pinch points.

The following sections of the report detail the various forms of Traffic Calming Measures and then proposals for each site are considered in turn. Drawings 47068226/SK/001 & 002 in Appendix B show the locations considered.

2 TRAFFIC CALMING FEATURES

This section provides a high level overview of various traffic calming measures that could be implemented within the village to encourage lower traffic speeds and potentially reduce traffic flows.

2.1 Gateways

Gateways are a feature to show the boundary to a village and a reduced speed limit zone. Through increasing driver awareness of a change to the character of the road and environment they aim to help reduce vehicle speeds through the area. To achieve the greatest speed reduction, the Gateway must be as conspicuous as possible and can use both horizontal and vertical features to achieve this.

Horizontal elements include different coloured surfacing which should be at least 5m long. Road markings, such as hatching in the centre of the road, can make the carriageway appear narrower. Vertical elements are generally signs mounted on posts, although they can be mounted on other features if approved by the council. Such features may include fences or brickwork. The idea of using these features is that the Gateway stays in keeping with the surrounding area, whilst also making the Gateway more conspicuous. It can also represent the character and the pride of the village and helps encourage lower vehicle speeds. The village entry sign could be moved to the Gateway to emphasise the arrival into the village.

Figure 1 – Gateway feature including coloured surfacing, speed roundel, and slow marking - http://www.its.leeds.ac.uk/staff/fomdir/trafman.html

Gateways can be effective at reducing vehicle speeds at that location; however they are not proven to be effective at reducing vehicle speeds throughout the village. Therefore, other means of traffic calming needs to be introduced after Gateway features in order to keep vehicle speeds low.

To try and improve the conspicuity of the Gateway, the following additional features could be introduced:

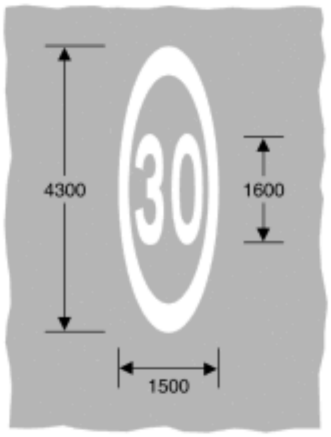
- Roundel roadmarkings;

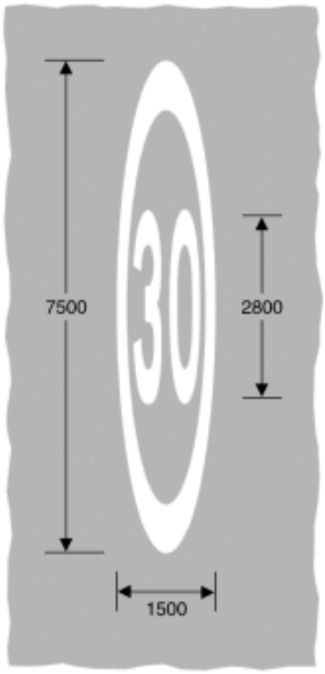
- Coloured Surfacing;
- Dragons teeth; and
- Road Narrowing.

2.2 Roundels

Speed roundel markings are white thermoplastic elongated circles with the speed limit in the centre which are applied to the road surface. Roundels must be placed in conjunction with upright speed limit signs or repeater signs. Speed roundels can be placed on red coloured surfacing to increase their conspicuousness.

Roundels require regular maintenance as wear and tear and adverse weather conditions can render them difficult to see. Speed Roundels cannot be used in place of speed limit signs but may be used to accompany them. The design of speed roundels needs to conform to the proportions set out in the Traffic Signs Regulations and General Directions (TSRGD) Diagram number 1065, which allows the design of two different sized roundels, as shown in Figures 2 and 3. Speed roundel markings have been shown to give slight speed reductions, although they need to be used as one of a combination of measures to reinforce their effect.





1065
Maximum speed limit
(Alternative sizes)

Figures 2 & 2 – Small and Large Speed Roundel, 1065 – TSRGD 2002

Often when drivers enter a lower speed limit area, they do not slow down to comply with the new speed limit. As such, it is important to make the new speed limit obvious. The speed limit roundel markings are low cost measures that alert drivers to a change in the speed limit.

To be most effective 30mph speed roundels need to be placed at both Gateways into the village and also by speed limit repeater signs. They can be painted onto a coloured background to make them more conspicuous. There are 9 speed limit repeater signs throughout the village, so it is possible to place speed limit roundels at all of these locations.

Figure 3 – Speed Roundel with coloured surfacing

2.3 Speed Repeater Signs

There are currently 9 speed limit repeater signs through Loxwood as well as the two threshold speed limit signs at the boundary. However, from inspection during the URS site visit it was identified that these 9 speed limit signs required maintenance. Most of the signs are partially or fully hidden to at least one lane of traffic by overgrown vegetation. One of the signs has faded to such a degree that the red circle is no longer visible and consequently is less likely to attract a driver's attention. Another sign has been slightly defaced and requires cleaning. Therefore, the signs are not working to their full extent which could be contributing to the proportion of vehicles speeding through the village. Figures 6 and 7 below show the faded sign and the defaced sign.

Figure 4 – Speed repeater signs with speed roundels, coloured surfacing and dragon's teeth -

Figure 6 – Faded Speed Limit Repeater Sign

Figure 7 – Defaced Speed Limit Repeater Sign

By trimming the hedges and trees next to the speed limit signs they will become more visible and noticeable to drivers and so help to reinforce the speed limit through the village. Some simple maintenance of these signs could also help to improve their effectiveness and would be an inexpensive means of helping to reduce vehicle speeds through Loxwood.

Further signs could be placed in Loxwood to encourage drivers to respect the presence of pedestrians and with the aim of increased driver awareness to such hazards.

2.4 Coloured Surfacing

Coloured surfacing can help to induce driver caution and increase awareness. As such, coloured surfacing is used at a point of entry to a reduced speed limit or before hazards, such as tight bends or at junctions. Coloured surfacing is not a traffic calming measure on its own, but should be used in combination with other features to help improve driver awareness. It is often used in combination with speed roundel markings to help draw attention to them.

2.5 Dragon's Teeth

Dragon's Teeth are triangular road markings perpendicular to the edge of the carriageway; they are often used on the approach to a Gateway to improve its conspicuity. However, their effect is considered to be limited as they can only be seen from close range and consequently their effect on vehicle speed is minimal. The design of dragon's teeth is shown in Figures 8 & 9.

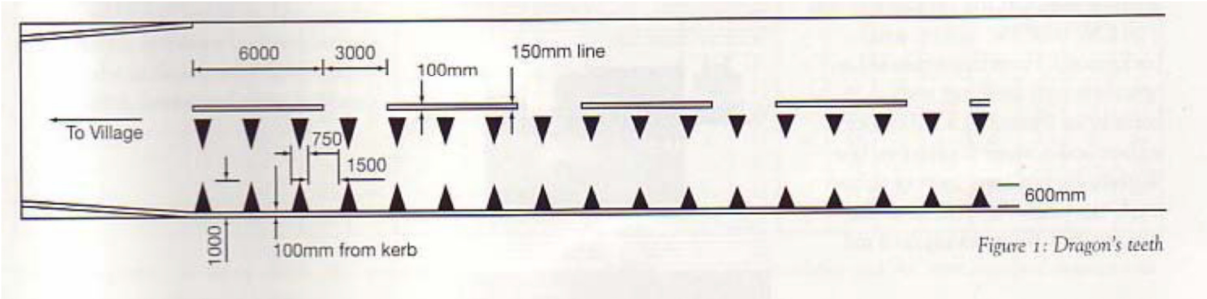


Figure 5 – Dragon's Teeth road markings dimensions – TAL 01/00 – Traffic Calming in Villages on Major Roads

Figure 6 – Dragon's Teeth and coloured surfacing at speed limit sign

2.6 Road Narrowing

Road narrowing can be used at Gateways to help reduce vehicle speed by limiting the width of the carriageway. Road narrowings can be created either by a kerb build out to physically reduce the width of the road or by the use of road markings to visually reduce the width of the road. Often at Gateways the road narrowing is created by road markings alone. This gives the illusion that the road is narrower than it actually is and so drivers slow down. It is an inexpensive option and when used in conjunction with other traffic calming features at Gateways it can help speed reduction.

Figure 7 – Road Narrowing with cycle bypass - http://homepage.ntlworld.com/pete.meg/wcc/good-practice.htm

2.7 Flat-Top Crossing

The crossing is a speed hump with a flat plateau that is at least 2.5m wide at the kerb height which allows pedestrians to use it. Being level with the footway makes the crossing easier for people with mobility impairment or wheelchair users. Adequate road markings need to be provided for blind or partially sighted people to recognise that it is a formal road crossing and not just carriageway.

The advantage of this option is that it is primarily a speed hump but it also acts as a crossing facility. The speed reductions associated with flat-top crossings depend on the approach speed, the height of the hump, the gradient of the ramp and the length of the hump. The disadvantage of a kerb-to-kerb flat-top crossing is that it may require additional drainage, normally in the form of gullies, on both sides of the carriageway on the uphill side (Local Transport Note 01/07, Traffic Calming, 4.2.5).

The design requirements of a Flat-Top Crossing are that it has a minimum plateau length of 2.5m, a maximum plateau length of 20m, a maximum height of 100mm, and it has a maximum gradient of 1:10.

The required road markings for a flat-top hump are shown in Figure 12. The markings need to be highly reflective so that vehicles can see the hazard at night and have sufficient time to slow down for the road hump. The required signs and markings for a flat-top hump are diagrams 544.1, 557.1 and 1062 from TSRGD.

Figure 8 – Flat-Top Crossing -

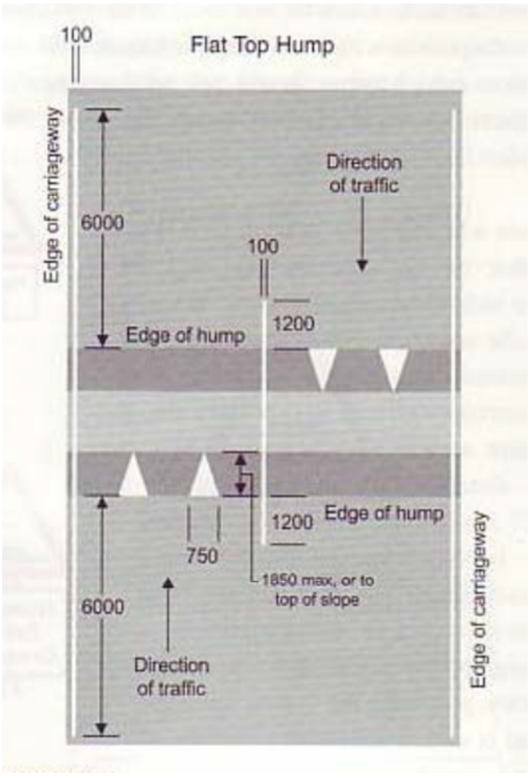


Figure 9 – Flat-Top Crossing Road Marking Dimensions – TAL 07/96 – Highways (Road Humps) Regulations

The regulations permit isolated road humps, but it is recommended that a speed reducing feature is used in advance of a road hump to avoid high speeds that could have safety implications. The feature should be less than 60 metres in advance of the first hump to be most effective (LTN 01/07, 4.4.3).

2.8 Road Hump / speed cushions

Road humps / speed cushions are vertical deflections in the carriageway and are often considered to be one of the most effective measures in speed reduction and can also reduce traffic flow by as much as 25%. The height of the deflection is typically 75mm. The signs and road markings for road humps are to comply with the requirements of the TSRGD.

There are some disadvantages to the use of road humps as they can cause passenger discomfort in buses, slow down emergency vehicles, create additional noise, vibration and pollution from decelerating and accelerating vehicles and, occasionally, can result in grounding of certain vehicles if the ramps are too steep or too high.

Local Transport Note 01/07 Traffic Calming states

4.2.19 *Speed cushions cannot be used in the zig-zag areas of pedestrian crossings. They should also be located away from where pedestrians are likely to cross the road, so that the chances of pedestrians tripping over them are minimised.*

Therefore, speed cushions will need to be placed away from the crossings at North Hall, the shops, and the Church. However, to achieve their maximum speed reduction effect they should be placed close to where low speeds are most wanted.

Longitudinal spacing of road humps or cushions also influences their effectiveness in reducing vehicle speeds. Spacing of between 20m and 150m between humps/cushions is recommended, although studies have indicated 60m to 80m is more common to reduce 85%ile speeds to below 30mph.

The Highways (Road Humps) Regulations also require highways with speed limits in excess of 20mph to be lit for the installation of humps/cushions. Any departure from this would require derogation from the Highway Authority.

Road humps and speed cushions have not been considered further in this report following discussions with LPC.

Figure 10 – Speed Cushion

2.9 Build Out

A kerb build-out is a feature that extends into the carriageway on one side only to narrow the road. The build-out reduces the carriageway width to only one lane and priority must therefore be given to one direction of traffic to avoid any confusion. Adequate signing and road markings are therefore also required.

Build-outs are most effective at reducing vehicle speeds when the traffic flows in each direction are balanced, since meeting opposing traffic is what causes drivers to slow down. However, during tidal flows vehicles are unlikely to meet opposing traffic and so can still drive relatively quickly through the available gap.

From the traffic survey data obtained in Loxwood the traffic flows through the village appear to be tidal during the morning and afternoon peaks, as shown in Figure 14 below and, consequently, such a feature may not be as effective as other measures. However, further traffic modelling analysis of vehicle flows can be conducted to identify likely effect such features may have.

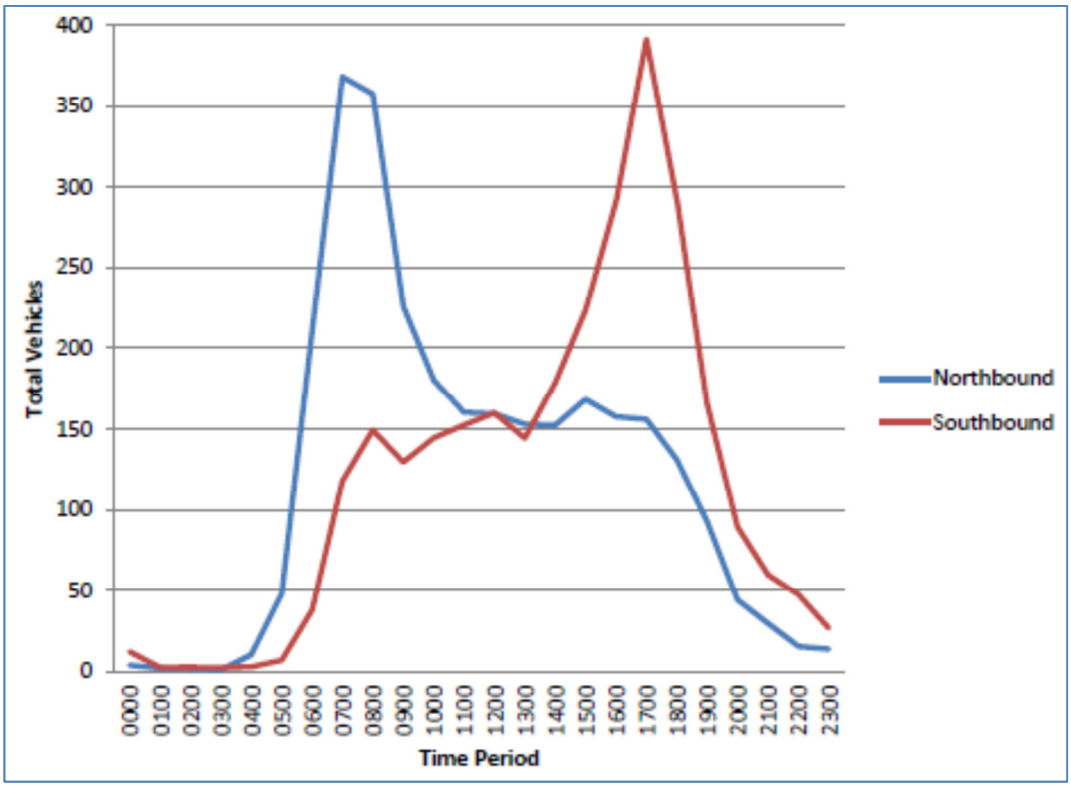


Figure 11 – Traffic Flow along the B2133 on an Average Weekday

A build-out can also be used as a crossing point which allows pedestrians to cross at a narrower section of road which reduces the crossing time. Furthermore, the build-out provides pedestrians with an increased visibility of the road.

Figure 12 – Build Out with priority given

The required signs needed for a build out are Diagrams 615 and 811 from TSRGD. These signs show what lane has priority at the build-out. Diagram 544.1 (TSRGD) could also be used in order to warn vehicles that pedestrians could be crossing (see Figure 16 below).

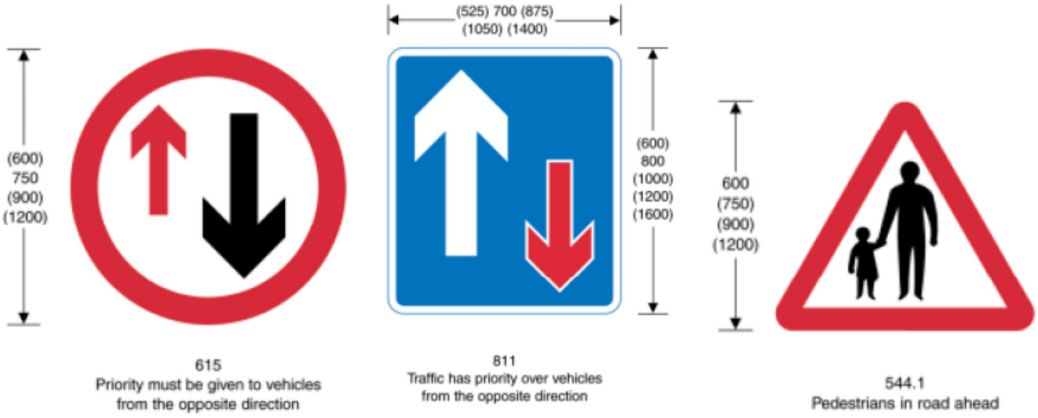


Figure 13 – Traffic Signs 615, 811, 544.1 – TSRGD 2002

2.10 Chicanes

Chicanes are another form of road narrowing formed by locating build-outs alternately on each side of the carriageway. By closely spacing build-outs to form the chicane, at say 10m to 15m separation, they can be an extremely effective traffic calming measure to constrain drivers' speeds. Wider spaced chicanes rely more on opposing traffic to provide effective speed reductions.

A single-lane working chicane allows traffic in both directions but there is only room for one vehicle to pass through at a time. Generally, a priority is given to one direction so that the possibility of vehicle conflicts is minimised. Priority should be given to vehicles leaving a traffic-calmed area, so that the speed of vehicles when first entering is reduced.

Chicanes have been used successfully in traffic calming schemes. However, in some instances the features have been removed because of complaints from residents, emergency services, or bus operators, since closely spaced build-outs can make it difficult for large

vehicles, such as buses and lorries, to manoeuvre through the chicane. Consultation with local residents, the highway authority, bus operators and the emergency services prior to installation of horizontal deflections is a necessary part of the design process. Any consultation should also include haulage associations and farmers in rural areas.

Figure 14 – One way Chicane with Priority - http://www.geograph.org.uk/photo/1868681

2.11 Footway Extension

A footway extension is a form of road narrowing where a length of kerb is built out into the carriageway on one or both sides. It is a traffic calming feature as drivers naturally slow down due to the narrower carriageway width, although the extent of the narrowing determines how much drivers will slow down. The narrowing can vary to either a one lane road or a two lane road; although for a one lane road, priority in a certain direction will have to be established. Narrowing the road to a one lane section increases its effectiveness as a speed reduction feature.

A footway extension benefits pedestrians as it increases the footway width and also can reduce the road crossing distance and time taken to cross. It also provides pedestrians with a better visibility of the road, and road users a better visibility of pedestrians.

Figure 15 – Footway Extension - LTN 02/95 – The Design of Pedestrian Crossings

2.12 Pedestrian Refuge

A pedestrian refuge is an island in the middle of a carriageway that allows pedestrians to cross the road in stages. Pedestrian refuges can only be used on roads that have sufficient width so as to meet the minimum lane width and pedestrian refuge requirements. They also act as a road narrowing measure as a proportion of the carriageway is being taken up by the refuge. A refuge benefits pedestrians by allowing them to cross each lane individually rather than together. This should speed up crossing times as pedestrians can cross half the road when there is a gap in one lane of traffic only as opposed to waiting until there was a gap in both lanes simultaneously.

Figure 16 – Pedestrian Refuge with coloured surfacing

2.13 Shared Space

The Chartered Institution of Highways and Transportation publication Manual for Streets 2 defines a shared space as:

"A street or place accessible to both pedestrians and vehicles that is designed to enable pedestrians to move more freely by reducing traffic management features that tend to encourage users of vehicles to assume priority."

A shared space is a system that aims to accommodate both vehicles and pedestrians equally without giving priority to any one user type. To do this, the road needs to look different to a normal road to change the perception of drivers as to who has priority. This can be achieved through the use of different road surface treatment (e.g. different colour and/or material). Another key strategy is to remove features that segregate pedestrians and vehicles, for example, guard railing.

A certain type of shared space system that removes segregation is a Level Surface. A Level Surface is a street surface with no level difference to segregate vehicles and pedestrians. This is created by raising the road to the kerb height. Local Transport Note 01/11 'Shared Space' states:

"1.17 A level surface is often intended to remove a physical and psychological barrier to pedestrian movement. It can also indicate to drivers that pedestrians are not confined to the footway and that they can expect to encounter them in the whole of the street."

A Level Surface shared space reduces vehicle speeds due to driver uncertainty; this is created through a lack of signing, the removal of pedestrian segregation and a level surface, which can initially act as a speed hump that vehicles must slow down for. Vehicle speeds will also slow down at shared spaces due to no identifiable priority being given to any one type of user.

By creating a level surface it would help encourage slower vehicle speeds, pedestrians will feel more comfortable using the space and will feel more confident when crossing. Shared spaces tend to still have pedestrian only areas, like a standard pavement at the edges of the shared space.

Figure 17 – Shared Space – New Road, Brighton (LTN1/11)

On-street parking can be reduced by placing bollards along the road, so that cars cannot park. By preventing on-street parking the visibility at junctions can be much improved. These bollards can also be used to denote pedestrian only sections.

2.14 Hatched road markings

Central hatched road markings give drivers the impression that the carriageway is narrower than it is in reality, although they have the benefit of being easily overrun by large vehicles when necessary. The effect of the hatching is further reinforced if the road markings are applied on a coloured background such as red. Debris can, however, build up in this area through lack of trafficking, which may result in safety issues and also give the appearance of neglect.

Figure 18 – Hatched Road Markings -

2.15 Vehicle Activated Signs

Vehicle activated signs are LED illuminated signs that are used to warn drivers of inappropriate speeds on the approach to a hazard or with a speed limit zone. They remain blank until they are activated by a vehicle that is travelling above a pre-set speed, which triggers the sign to become illuminated. The signs can warn of a hazard, such as a tight bend, or of the speed limit to remind people who are speeding to slow down. Vehicle activated signs are left in position permanently, and can be connected to an electricity supply or they can be powered by a solar panel or wind generator. As there is no street lighting within the village, the use of wind and/or solar power would likely be required for these signs.

Figure 19 – Vehicle Activated Signs -

2.16 Speed Indicating Devices

Speed Indicating Devices measure and display vehicle speeds on the sign. Speeds above the speed limit get displayed in red whereas speeds below the speed limit get displayed in green. They are often used in villages but are only temporary as they are rotated through various locations. They stay in place for 2-3 weeks before being moved to the next location. To get the most benefit out of them they are often placed close to a change in speed limit.

Figure 20 – Speed Indicating Device - http://www.pwssigns.com/driver-feedback-signs-speed-sign-radar-sign-dfs

2.17 Street Lighting

Most of the traffic calming features described above should have adequate lighting levels to warn motorists of the features. However, Loxwood village does not currently have street lighting and LPC has expressed a desire to maintain the existing arrangement. Therefore, any traffic calming measures proposed will have to be discussed with West Sussex Highways Department to ensure that at each location an adequate risk assessment is undertaken for the proposed traffic calming measure. All road markings and road signs will need to have the correct level of reflectivity to warn motorists of the hazard.

URS has spoken with representatives of West Sussex Highways Department regarding this commission. URS has been advised that there are no preconceived ideas on traffic calming for the village and that the proposals could be innovative and will be considered on an individual basis.

3 FOOTWAY WIDTHS THROUGH LOXWOOD

A key problem in Loxwood is the narrow footway widths at various locations. This was identified in URS' previous report and showed that the footway widths are very narrow in several places which can make pedestrians feel unsafe using them, especially with the speeding cars along the main road.

Along the High Street the footways are generally greater than 1.0m in width with the exception of a short section at the southern end of the village at the Listed "Mellow" house near to "The Wharf" where the width is 0.95m wide.

In many locations, the footway widths are reduced by overgrown hedges. This is a problem that could easily be addressed by cutting them back to the Highway Boundary. Implementing this would provide pedestrians with more space and would make them feel safer when walking along the main road. It would also provide better visibility for both vehicles and pedestrians.

One area of footway that is particularly affected in Loxwood is by the Mellow house, along the B2133. The footway width is less than 1.0m wide at this location. The footway width is measured from the kerb to the building, which is listed. The only option to improve this section of footway would be to move the kerb further into the carriageway and reduce the lane widths. However, this would result in realigning approximately 50m of the carriageway to provide a smooth alignment. This section of footway is located between the main part of the village and the pub and the church. The footway is therefore used by a variety of different pedestrian users. Increasing the footway width at this location would increase the safety of the users and might encourage more people to walk between these locations as opposed to using other means of transport.

4 CYCLE FACILITIES

The typical carriageway width is between 6.5 and 7.3m through the village. Advisory cycle lanes need to be a minimum 1.5m wide, resulting in traffic lane widths of approximately 1.75m which is considered to be too narrow. In addition, as the 85th percentile speeds are in excess of 40mph, the traffic speed is considered to be too high for cyclists to feel safe.

The footways are too narrow to provide either a shared or segregated footway/cycleway. Footways would need to be a minimum 3.0m wide and that is clearly not achievable throughout the village.

It is recommended that cycle facilities be deferred until other traffic calming measures are implemented and vehicle speeds reduced. Chicanes and build-outs can be designed to accommodate short lengths of cycle path to enable cyclists to avoid the obstruction.

5 HGV BAN

LPC has requested URS investigate the possibility of introducing an HGV (except for access) ban on the whole of the B2133 between the A281 in the North and the A272 in the South.

URS considers this to be an issue that affects adjacent Highway Authorities (Surrey) and Parish Councils and cannot be considered in isolation. Any ban on HGV movements would increase traffic flows on adjacent primary roads such as the A281 and A272, but also on more local routes as vehicles will use alternative routes that may not be suitable and therefore "push" the problem elsewhere.

URS suggest that if a comprehensive traffic calming strategy is developed through Loxwood, traffic may naturally find alternative routes owing to the potential increased journey times and inconvenience of traffic calming measures.

If LPC wanted to pursue the HGV ban, URS recommend that the issue be raised with West Sussex County Council in the first instance to discuss their thoughts on the ban before discussions are held with other Local Parish and County Councils to agree Local Plans and review of appropriate policies.

6 POTENTIAL TRAFFIC CALMING FEATURES AT EACH LOCATION

6.1 Gateways into the Village

The existing Gateway features for the village consists of coloured surfacing strips across the road on the approach to the gateway and the 30mph speed limit sign mounted on a yellow background.

To try and improve the conspicuity of the Gateway the following additional features could be introduced:

- Roundel roadmarkings
- Coloured Surfacing
- Dragons teeth
- Road Narrowing
- Welcoming Signs, walls and murals

6.2 Speed Limit Repeater Signs (various locations)

It is proposed that 30mph speed roundels be placed by the speed limit repeater signs. They should be painted onto a coloured background to make them more conspicuous.

6.3 North Hall Crossing

North Hall is located to the north of the village and it is on the main road, the B2133. It is the village hall and is used for a variety of purposes including baby & toddler sessions and is used regularly. However, North Hall has poor pedestrian access. The hall is on the west side of the B2133 whereas most of the village is located on the east side of the road. In order for people to travel to North Hall by foot, they have to cross the busy road with high vehicle speeds.

The existing crossing facilities to North Hall are very basic, consisting only of a dropped kerb on either side of the carriageway, as shown in Figure 24. The dropped kerb on the west side is about 50mm above the carriageway level, which is a potential trip hazard and makes the crossing more difficult for mobility impaired people or wheelchair users and people pushing prams. The crossing does not have any tactile paving and so represents a hazard for blind or partially sighted people.

Another problem with the pedestrian access is the footpath from the crossing to North Hall. The footpath has a very thin entry and is prone to flooding in the winter; LPC advised that this will be addressed separately. Due to these factors, the majority of people choose to drive to North Hall. Those that do travel to North Hall by foot tend to cross opposite the car access, away from the actual crossing, to avoid the footpath.

Figure 21 – North Hall Crossing

Loxwood Parish Council wants to improve the crossing facilities and pedestrian access to North Hall in an attempt to encourage more people to walk to the hall. At the same time as improving the pedestrian access, LPC would also like the crossing to have a dual purpose as a traffic calming feature. There are a variety of options to consider in order to address these criteria, as outlined below:

- Flat-top Crossing
- Build Out Crossing
- Footway extension
- Pedestrian Refuge

6.3.1 *Flat-Top Crossing*

A flat top crossing (with relevant signs and roadmarkings) would provide a flush surface for pedestrians to cross the carriageway, whilst providing a vertical traffic calming feature that would slow vehicles down. Minor footway improvements would be required on the western side to tie into the proposed footpath improvement measures that LPC will address separately.

6.3.2 *Build Out*

The build-out should be built on the eastern side of the carriageway so that traffic entering the village will not have priority and will have to give way to any vehicles traveling north out of the village. As noted in Section 2, build-outs are only effective at reducing vehicle speeds if the traffic flow is balanced, as meeting opposing traffic is what causes drivers to slow down. As this site experiences tidal flows, vehicles are unlikely to meet opposing traffic and so can still drive relatively quickly through the available gap.

The build-out can be used as a crossing which allows pedestrians to cross from the build-out which reduces the crossing distance and therefore crossing time. The build-out also provides pedestrians with an increased visibility of the road.

It is considered that this form of measure would not be particularly effective at this location.

6.3.3 ***Footway Extension***

The carriageway is approximately 7m wide opposite the footpath to the hall. It is feasible to narrow the carriageway to 5.5m width with a 750mm footway widening on both sides of the carriageway. This will offer improved pedestrian crossing facilities and could reduce traffic speeds.

6.3.4 ***Pedestrian Refuge***

It is not considered feasible to provide a central pedestrian refuge that is wide enough to cater for wheelchair users (min. 1500mm width, preferably 2000mm width) as the traffic lanes would be too narrow and would not be sufficient for HGVs to safely pass.

6.4 Post Office

The Post Office is located about halfway between North Hall and the Onslow Arms Public House in the centre of the village. This area is a busy part of the village as it hosts a number of shops and is located at the junction between the B2133 and Station Road. The Post Office is situated on the west side of the B2133 as opposed to the rest of the shops which are on the east side. There are a number of problems associated with this area of the village which will need to be addressed. The problems are:

- Footway Provision
- Pedestrian Crossing Facilities
- On-Street Parking
- Parking in the Bus Stop
- Traffic Speeds

6.4.1 ***Footway Provision***

Currently there are footways on both sides of the road; however, the footway on the west side by the Post Office is very narrow. This is a problem as the Post Office is highly utilised and should have better pedestrian access.

The footway could be widened over a length of approximately 30m to improve pedestrian facilities without adversely affecting the existing carriageway width traffic lane.

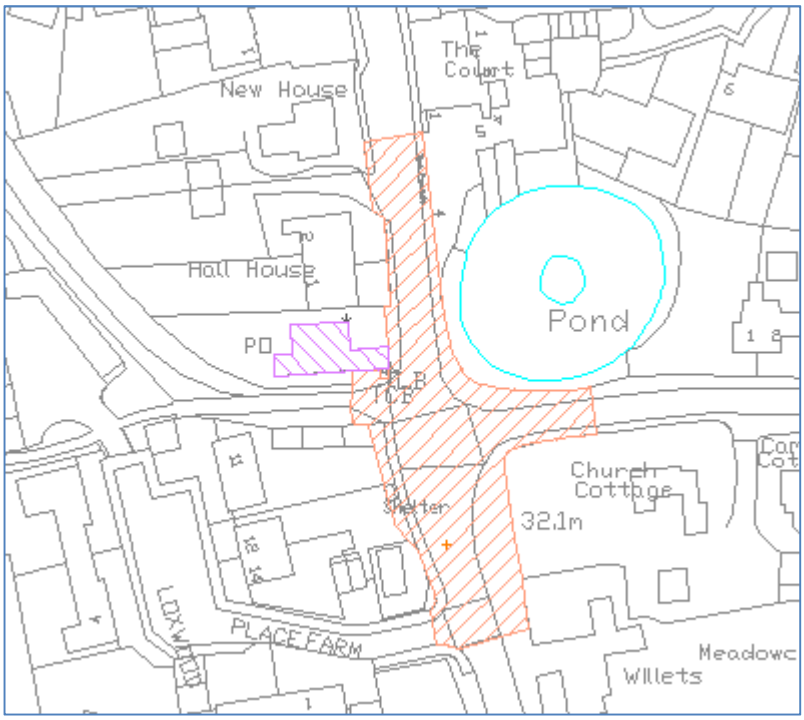


Figure 22 – Proposed Shared Space Area

6.4.2 ***Pedestrian Crossing Facilities***

There is currently an uncontrolled crossing on the B2133, which comprises dropped kerbs and tactile paving, located about 60m north of the Post Office. Consequently, pedestrians who are walking to the Post Office from Station Road are required to walk 60m north to the crossing only to then walk 60m south back to the Post Office. This is far from the desire line of pedestrians and, as such, most pedestrians will choose to cross away from the crossing at more convenient locations to them.

Due to the proximity of the two priority junctions (Station Road and Loxwood Place Farm), the use of a central pedestrian refuge is not considered to be feasible as large vehicles, such as refuse vehicles, may not be able to turn within the available carriageway space.

Formal crossing facilities are not considered to be feasible at this location assuming that the carriageway remains in its current form.

6.4.3 ***On-Street Parking***

As there is no car park or designated parking zone in this area there is a tendancy for on-street parking. Cars parking outside the shops causes a narrowing of the road, wide enough for one vehicle only. This can have a beneficial effect in calming traffic speeds since the parked cars act as a build-out.

However, a problem with uncontrolled on-street parking by the shops is the restriction of visibility caused to vehicles trying to pull out at the junction from Station Road. Parked vehicles can block the visibility to the right leading to cars edging out into the main carriageway before being able to see that it is clear, which could result in a collision. There are existing double yellow line markings around the junction with B2133 and Station Road, which should maintain

a minimum visibility to traffic approaching from the right of approximately 36m. Whilst less than the visibility typically required for a 30mph road, it is commensurate with likely traffic speeds at this location.

Parked cars can present a hazard to pedestrians since they restrict the intervisibility between moving vehicles and pedestrians. Since no formal crossing point across the B2133 exists close to the Post Office then pedestrians are more likely to attempt to cross the road at ad hoc locations which may put them at greater risk where cars are parked. A build out on the west side of the B2133 opposite the Post Office and at the end of the double yellow lines could be installed to provide a safe refuge for pedestrians waiting to cross the road allowing them to have better visibility of approaching traffic. It would also reduce the crossing width as well as physically defining the extent of on street parking provision. Any build out here would need to take account of required turning movements and visibility requirements for the junction with Station Road.

6.4.4 *Parking in the Bus Stop*

The Bus Stop is located just south of the Post Office. At present, due to the lack of formal parking facilities, vehicles park in the layby at the Bus Stop. There is only one bus service that runs through the village per day so parking here has not led to disruptions to the bus service. The Bus Stop consists of a bus shelter, containing the bus timetable; however, there is no sign saying that it is a bus stop, and the layby does not have Bus Stop markings, so could easily be mistaken as carriageway/parking area. Currently cars park here for access to the Post Office and shops. This space holds around 4 cars, as shown in Figure 26.

Formal parking bays could be provided in the bus lay-by and the bus stop could be moved a little to the south with an on-carriageway bus cage. Discussions with the bus operator would be required. This would then provide a formal space for a few cars and may result in a slightly wider footway.

Figure 23 – Parking in the Bus Stop

6.4.5 ***Traffic Speeds***

The high vehicle speeds along the B2133 make crossing the road more difficult and dangerous than it should be. By introducing traffic calming into this area it will make the road safer for all users.

6.4.6 ***Shared Space***

A variation on a shared surface space / 20mph zone could be provided with the carriageway built up to footway levels using different materials (e.g. block paving) and/or the use of a coloured surfacing e.g. a red area to contrast with the black carriageway space of the non-shared carriageway and widening the footways so that the carriageway/shared space is 5.5m wide.

There are many benefits of a shared surface such as encouraging lower vehicle speeds, making pedestrians feel more comfortable using the space and also more confident when crossing the road. The shared space could still have a pedestrian only area (i.e. footway outside shops/properties), delineated with a shoulder course of brick or bollards and different coloured surfacing for example at the edges of the shared space to assist visually impaired people.

Due to the location of the Post Office by the junction, the shared space should start from Loxwood Place Farm up to Hall Hurst Close and should also extend into Station Road.

Car parking could still be maintained outside of the shops (informal, i.e. no road markings) as they would also act as a traffic calming feature.

6.5 The "Mellow" and Pedestrian Crossing to Church

The footway outside the Listed building named "Mellow " could be widened to provide a minimum footway width of 1200mm by realigning a section of the eastern kerb and potentially realigning the western side of the carriageway into the verge over a short section.

Pedestrian crossing facilities across the B2133 in the vicinity of the church could be provided in the form of a central pedestrian refuge, subject to a localised realignment of the carriageway into the verge on the western side and new footway provision on the western side..

6.6 Station Road/Willetts Way

Loxwood Parish Council raised concerns about the crossing facilities on Station Road at Willetts Way. The crossing is primarily used by people travelling to and from the school, which is in Nicholsfield. Consequently there are a lot of children utilising the crossing so it needs to be safe and provide good visibility so that the children can be seen by drivers. The current crossing facility consists of dropped kerbs, and tactile paving. The visibility at the crossing is reasonably good, although as the crossing is very basic, it is not very visible to drivers.

Another problem with the crossing is that many cars park along Station Road at school drop off and pick up times. Cars park along Station Road and park right next to the crossing which can make crossing harder due to a reduced visibility.

There are two options that could be considered for this location, these are:

- Build Out Crossing
- Footway extension

6.6.1 ***Build-Out Crossing***

It is suggested that the footway be widened on the south side of the road to improve visibility for pedestrians and reduce the crossing width.

6.6.2 ***Footway Extension***

A footway extension is a form of road narrowing, where a section of kerb is built out into the carriageway on both sides opposite each other so that the carriageway is only wide enough for a single traffic lane and traffic will have to give way to each other with no dedicated priority.

Unlike at North Hall, a flat-top crossing should not be considered as it will not prevent cars from parking either on it or close to it. Also, a pedestrian refuge should not be considered as there is insufficient carriageway width to cater for one.

6.7 Walking bus to school

If parents of the schoolchildren were willing to form a group that could “shepherd” the pupils to the school from a dedicated point such as The Onslow Arms car park in the morning, traffic in the area would be reduced as parents could use the pub car park (subject to owner’s permission) and stay away from the busy congested residential streets around the school. The route is generally along “twittens” and would only require them to cross Willetts Way (a quiet cul-de-sac) and Station Road at the formal crossing point. However, this option would have to be approved by the school.

6.8 Car Parking in Nicholsfield

Loxwood Primary School is located in Nicholsfield. Nicholsfield is a quiet residential street except around school drop off and pick up times, when it becomes very busy with parents leaving/collecting their children. Nicholsfield is a cul-de-sac and so parents dropping off or collecting their children have to turn around and leave by the same entrance. There are several cars doing this and the road becomes very congested. Parents pull up onto grass verges outside residents’ houses or onto the pavement in order to park. This damages the grass, and can reduce the pavement width for pedestrians trying to walk to the school. Figure 27 shows an area where cars mount onto a grass verge.

Figure 24 – Damaged Grass Verge

As a result of vehicles parking on the grass verges outside residents' houses, some residents have created their own prevention methods, as shown in Figure 28, by placing metal poles in the grass, to try to prevent vehicles from parking there. This shows that the residents of Nicholsfield are dissatisfied having the school traffic parking outside their homes.

Figure 25 – Metal Poles Preventing Parking

To prevent parking along these streets highway authority approved bollards could be constructed in place of the residents' own devices. Bollards have already been created in one section of Nicholsfield towards the school to prevent parking.

Another option would be to encourage parents to walk their children to school, or to create a walking bus organization as noted above.

7 POTENTIAL DEVELOPMENT SITES

7.1 Mini-Roundabout

A mini-roundabout is a type of junction that allows vehicles to circulate around a central island. Vehicles entering the roundabout must give way to vehicles approaching from the right. Mini-roundabout's central islands must be between 1 and 4 metres in diameter. The island should be smooth and white, and may be flush or domed (but it must not be higher more than 125mm). The dome is raised to discourage vehicles from driving over the central island, but must be small enough to allow larger vehicles, who are physically unable to manoeuvre around it, to travel over it. Mini-roundabouts are introduced for four main reasons:

1. To improve the operation of an existing junction;
2. As an accident remedial measure;
3. As part of a traffic calming scheme; and
4. To provide access to a new development site.

Introducing a mini-roundabout in Loxwood at an access to a new development site would satisfy reasons three and four.

The Design Manual for Roads and Bridges, Volume 6, Section 2, TD54/07, states that:

"2.1 Mini-roundabouts must only be used on roads with a speed limit of 30mph or less and where the 85th percentile dry weather speed of traffic is less than 35mph within a distance of 70 metres from the proposed give-way line on all approaches, unless installed in combination with speed reduction measures.

2.2 Where the existing 85th percentile dry weather speed is 35mph and above and a mini-roundabout is installed in combination with speed reduction measures in anticipation of reducing speeds to the required level, post installation vehicle speed monitoring must be undertaken. In the event that vehicle speeds remain at 35mph or above, further speed reducing measures must be installed."

Therefore, if a mini-roundabout is constructed anywhere in Loxwood there will need to be sufficient traffic calming features before it to reduce the 85th percentile to less than 35mph. With the current 85th percentile speed being 40.5mph, traffic calming measures on the approaches to the mini-roundabout will have to reduce traffic speed by more than 5.5mph.

7.2 Potential Development Site by North Hall

There is a potential development site just north of North Hall. This would be a small development site with a size of 0.26 hectares, which would only contain about 5-6 dwellings. Due to the small size of the development site there would be an opportunity to allow access to the site using the existing North Hall site entrance. It would be feasible to incorporate this potential development site into a traffic calming scheme at one of two possible access points to the site as shown on drawing number 47068226-SK-001. The first option would be to place the mini-roundabout at the existing entrance to North Hall. The other option would be to change the access location to North Hall to opposite Spy Lane, and place a mini four-arm roundabout there.

7.3 Potential Development Site by the Nursery

There is a potential development site at the Conifer Nursery which has an area of 4.47 hectares. This would be the largest development and would be for approximately 45 units. There are two potential access points to the site. The first would be at the northern point along the B2133, as shown in Figure 29, and the other at the southern point, as shown in Figure 30. Both sites have good visibility, although the South entrance offers the better visibility and a mini-roundabout could be introduced at either of these access points. In order to create a roundabout at these locations it would need some of the land at the edge of the site. This would allow the roundabout to have sufficient curvature to slow traffic down.

Figure 26 – Southern Access to The Nursery Development Site

Figure 27 – Northern Access to The Nursery Development Site

The development site will need to provide adequate pedestrian access. The site is on the west of the B2133 as opposed to most of the village which is on the eastern side, so there will need to be a crossing facility to the site. This could be incorporated into the mini-roundabout in the form of a pedestrian island. This would also segregate the entrance and exit of an arm of the roundabout.

7.4 Potential Development Site at Loxwood Place Farm

This site is situated south of the Post Office by Loxwood Place Farm. The site would be a medium sized development as it has an area of 1.32 hectares. The potential access to the site would be at the north of the site along the B2133, as shown in Figure 31. As with the other potential development sites there is an opportunity to incorporate this site access into the traffic calming scheme by introducing a mini-roundabout at the entrance to the site. As with the other potential sites, the site at Loxwood Place Farm is situated on the west side of the B2133 and so a crossing facility would need to be introduced as well to allow pedestrian access to the site. Again, this could be done by creating a pedestrian refuge on one of the arms of the mini-roundabout along the B2133.

Figure 28 – Access to Loxwood Place Farm Development Site

7.5 Way Forward

In order to comply with design standards, the 85th percentile vehicle speed needs to be reduced to less than 35mph before a mini roundabout can be installed. In order to achieve the speed reduction, it is recommended that a suite of traffic calming measures are introduced to slow vehicles down throughout the entire village, then undertake a new speed survey to obtain the 85th percentile speed. Once the speed complies with standards, then consideration of the form of the junction for the development can be developed. If the traffic speeds are still in excess of 35mph, further traffic calming measures will be required in order to lower traffic speeds.

8 INDICATIVE COSTS

The following table provides indicative costs for potential traffic calming measures. The costs have been taken from Local Transport Note 1/07 – Traffic Calming and have not been factored to reflect today's costs as URS does not undertake cost consultancy work. Also note that the cost of each feature will vary on the number and extent of works, drainage/utility alterations and contractor's preliminaries and profit.

Traffic Calming Feature	Indicative Cost (£)
Raised Junction / Table Top	10,000 approx.
Chicane	3,000+
Mini-roundabout	5,000 – 15,000+
Vehicle activated sign	2,000 each (no power connection required, but solar/wind power required)
Coloured surface	500 per location
Roundels	200 per location
Footway widening/kerb build out	2500+

9 SUMMARY OF OPTIONS & RECOMMENDATIONS

The following table summarises the suitability of various options available at each location within the village.

Location	Northern Gateway	North Hall	Post Office / Shops	B2133 adjacent to Mellow building	B2133 adjacent to the Church	Southern Gateway	Station Road	Nicholsfield / Loxwood Primary School	Other locations as required
Dragon's Teeth	✓					✓			
Roundel Roadmarkings (at locations of speed limit terminal and repeater signs)	✓					✓			✓
Road narrowing	✓					✓			✓
Vehicle Activated Signs									✓
Table Top Crossing/junction		✓	✓						
Kerb Build out		✓	✓				✓		✓
Footway Extension/widening		✓	✓	✓			✓		✓
Pedestrian Refuge					✓				
On Street Parking Bays									
Shared space			✓						
Parking restrictions								✓	

A priority list of applicable measures at each location is shown in the table below:

Location	Northern Gateway	North Hall	Post Office / Shops	B2133 adjacent to Mellow building	B2133 adjacent to the Church	Southern Gateway	Station Road	Nicholsfield / Loxwood Primary School	Other locations as required
Dragon Teeth	1=					1=			
Roundel Roadmarkings and coloured surfacing (at locations of speed limit terminal and repeater signs)	1=					1=			1
Road narrowing	2					2			4
Vehicle Activated Signs									2
Table Top Crossing/junction		1	2=						
Kerb Build out		3	3				2		3=
Footway Extension/widening		2	2=	1			1		3=
Pedestrian Refuge					1				
On Street Parking Bays									
Shared space			1						
Parking Restrictions								1	

Consultation with local residents, the highway authority and the emergency services prior to installation of horizontal deflections is a necessary part of the design process. Besides the groups mentioned, consultation should include haulage associations, bus operators and farmers.

Traffic calming measures need to be considered for the whole of the site and not just at each location as the combined strategy will need to be compatible in order to reduce traffic speeds and potentially traffic flows. It is recommended that LPC consider the options available at each site and then develop a traffic calming strategy in conjunction with URS, West Sussex County Council and any potential Developers.

APPENDIX A

Traffic Calming in Loxwood

Background

URS have carried out a traffic survey for the Loxwood Neighbourhood Plan Steering Group, which is detailed in URS report ref. 47060782 dated May 2013.
The report establishes that on the B2133 between Station Road and Spy Lane, 78.5 % of traffic exceeds the speed limit with an 85th percentile of 40.5 mph.

The average North and South combined traffic flow from the morning peak period (7am) to the end of the PM peak period, was 395 vehicles per hour. The maximum combined traffic flow was 547 vehicles, recorded between 5pm and 6pm.

The total HGV movements were on average 227 northbound and 208 southbound, or 436 combined, which represents 7.7% of all traffic.
The greatest number of HGVs in a single hour was recorded between 9am and 10am, with a combined flow of 39 HGVs, equating to 11% of all traffic during that time period.

The pavement along the same stretch of road is very narrow and in some cases overgrown.

The traffic report supports the conclusions from the Village Survey, which identified that Loxwood residents felt unsafe walking along the pavement bounding the B2133 and were worried about the safety implications of speeding traffic when crossing the B2133.

The Loxwood Parish Neighbourhood Plan will therefore seek to introduce traffic calming measures along the B2133 thus helping to mitigate the established safety risk.

The opportunity exists to use developer contributions and existing S106 money to carry out the traffic calming.

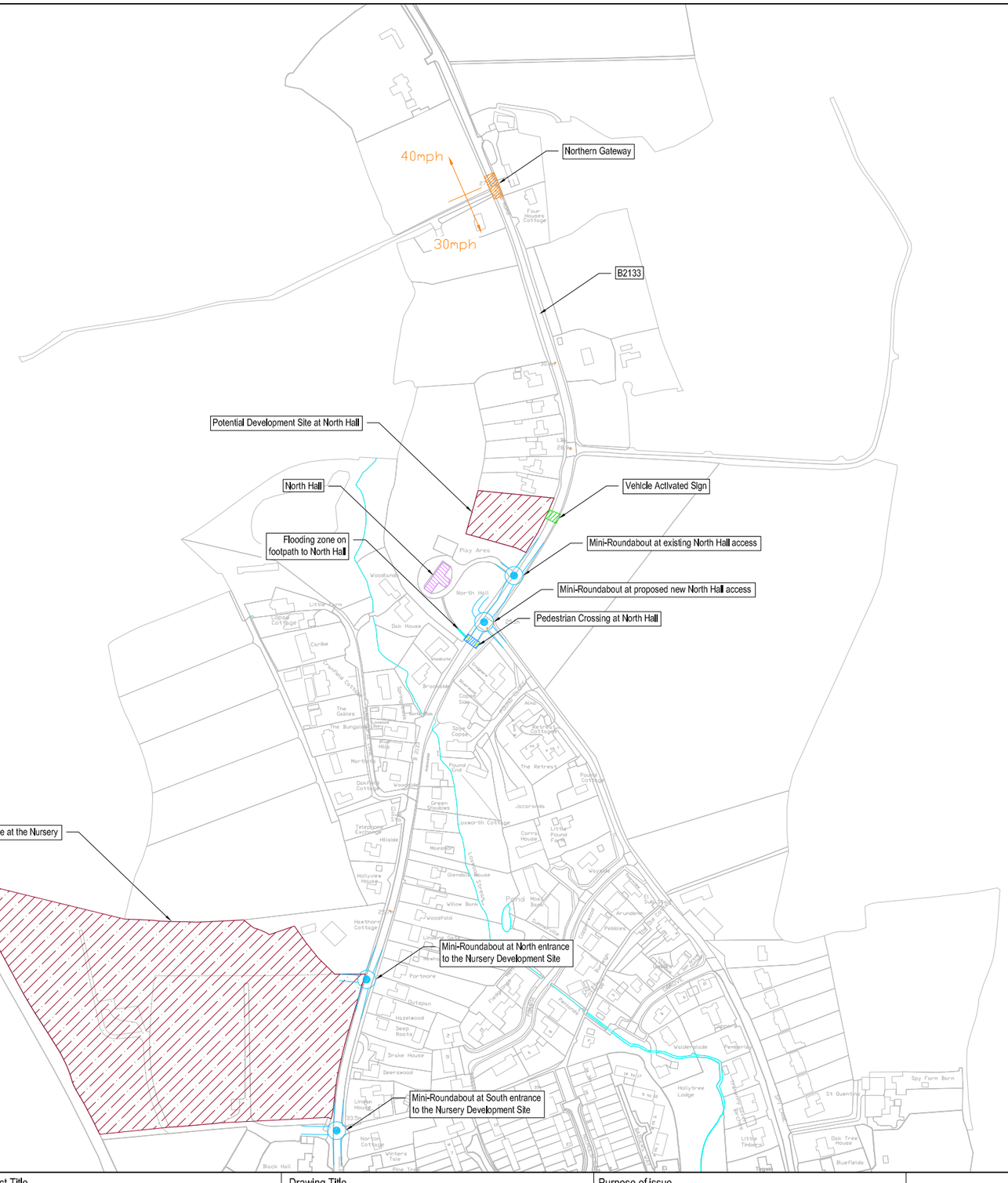
Accordingly, URS will be commissioned to carryout a top-level traffic calming study in accordance with the following specification.
The study should also include provisional costings for each of the measures recommended to be physically carried out.

Traffic Calming

1. The report should recommend traffic calming and speeding measures which could be applied on the B2133 between GR TQ 0409323 and TQ 041304
2. The report should also investigate how pedestrian crossing points could be provided:
    a. Along the B2133 enabling safer access to/from the church, post office and North Hall.
    b. Station road/Willetts Way crossing point at Nicholsfield providing safer access to the school from Farm Close/Willetts Way together with a 20mph speed restriction at school pick up and drop off times

3. The traffic calming recommendations should take account of the expected development of two sites along the B2133 and the potential that the entry and exit into the sites provides for traffic calming. The sites are Chichester District SHLAA sites LX0857 and LX 0855.
4. The report should also investigate the possibility of introducing an HGV (except for access) ban on the whole of the B2133 between the A281 in the North and the A272 in the South.
5. The report should also investigate the feasibility of introducing a 20mph speed limit on the B2133 between GR TQ 03853140 and TQ 038317.
6. The report should investigate the feasibility of widening the pavement between North Hall and the Onslow Pub enabling safe transit for the disabled and parents with pushchairs.
7. The report should address on road car parking adjacent to the shops, at the church and along Station Road at drop off and pick up times for the school children. It is possible that this could be incorporated into traffic calming measures?

APPENDIX B



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Revision Details	By / Check	Date	Suffix

Project Title: LOXWOOD TRAFFIC CALMING STUDY

Client: LOXWOOD PARISH COUNCIL

Drawing Title: TRAFFIC CALMING MEASURES IN LOXWOOD

Purpose of issue: FOR INFORMATION

Designed	Drawn	Checked	Approved	Date
DG	DG	AA		OCT 13

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Suitability: FOR INFORMATION

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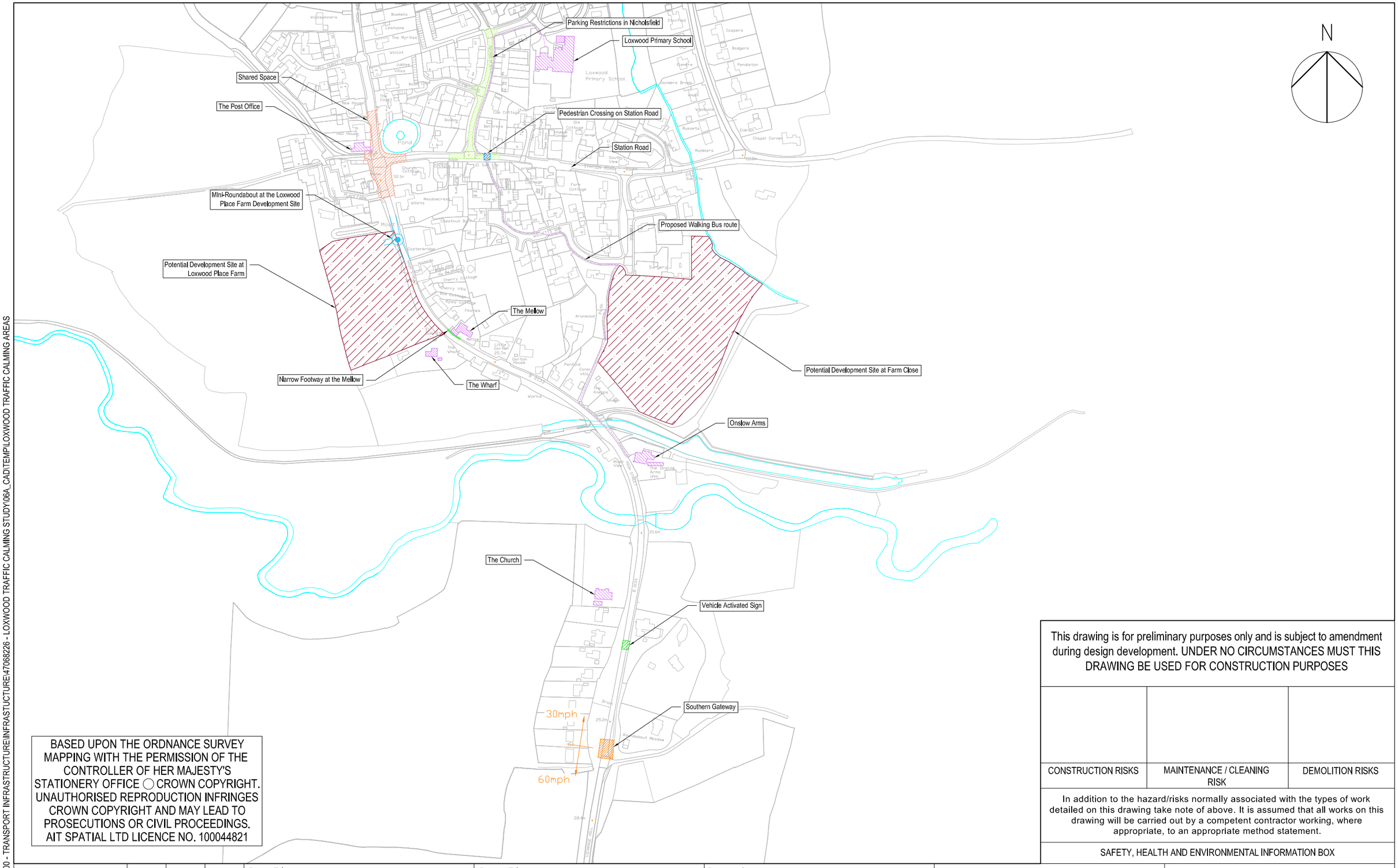

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